

Aliens Have Landed

Overview

In this introductory exercise, students use drawings of fanciful aliens to begin their exploration of basic concepts in Mendelian Genetics. Their first task is just to familiarize themselves with the similarities and differences among the individual aliens. The students then begin to speculate on how the individuals may be related to each other by looking at traits that seem to be passed down from parents to offspring. (This is what people did when they were first exploring these same questions, whether they were breeding plants and animals or looking at family traits in humans.) The details of these genetic mechanisms will be explored in depth in later exercises.

Textbook References

McDougal Littell

Unit C Chapter 4, pp. 101-107, Living Things Inherit Traits in Patterns

Prentice Hall

Chapter 14, Section 3 pp. 530-535, Mendel's Work

Materials

*Materials to be supplied by the teacher or the students are marked with an asterisk.

Materials for small groups (pairs)

- 1 set of Alien Cards (12 cards per set)

Materials for individual students

- *1 Science notebook

Procedure

1. During this exercise, you will be providing the students with a scenario concerning a group of aliens that has landed near your school. You will add to the scenario piece by piece as the exercise goes on.
2. Describe this scenario to the class:

“An alien spaceship landed last night on the school's football field. As the science class, we have been given the task of trying to learn as much as we can about them. We were able to take a picture of each alien.”
2. Pass out one set of Alien Cards to each pair of students and give them a few minutes to look at them.
3. Have a brief discussion, asking the students to share some of the things they have noticed.
4. Next, have each pair of students list as many different features of the aliens as they can in their notebooks. This is meant to be an open exploration at this point.

Not all students will see all forms of all features. A more organized list will develop as the students progress through the exercise.

5. Share. Students should find things like head shape (three different kinds), noses (two different kinds), etc.
6. Have each pair of students choose one feature and sort the aliens into groups. For example, if the students choose *head shape*, they would sort them into three groups—wide, narrow, and round. If they choose *noses* as their feature, they would have two groups—large and small.
7. Have groups share briefly what feature they chose. Make sure that all the students notice that some features can be sorted into two groups and others into three groups.
8. Add this to the scenario:

“After some communication with the aliens, we have learned that they are all members of the same family. And we know that there are three generations of this family.”

Tell students to sort the family into the three generations.

9. Have the class share how they sorted the alien family into generations. (Most will say that they sorted by age.)
10. Tell students to put all of the youngest generation back into the bag (Suzy, Larry, Bruce, Oscar, and Chuck). We will come back to these later.
11. *“We know that alien characteristics are often passed on from parent to child just as in humans.”* Ask students to try to determine which of the aliens in the middle generation are the children of Opah and Omah. This first attempt is, again, an open exploration. In the next step, students get a bit more information to focus their attention.
12. *“We have learned that Opah and Omah have three children. Your challenge is to rank in order from most likely to least likely which of the five aliens in the middle generation are the children of Opah and Omah. In your notebook, rank them and write a sentence or two next to each one stating a reason for the rank you gave them.”*
13. Share as a class. The students will probably come up with lots of different rankings based on many different criteria.
14. *“We have now learned that the genetics of these aliens follows the same rules as in humans. We need to learn more about how heredity and genetics work so we*

can understand our aliens better.”

15. Instruct the students to read in their textbooks the pages that provide the introduction to genetics (Prentice Hall, pages 530-535; McDougal Littell, pages 101-107). The students should make a “Genetics Terms” list of the important science terms that they read about and keep it in their notebooks.
16. Have students share their lists. The list will include such words as: Chromosome, gene, allele, heredity, dominant, recessive, phenotype, genotype, and trait.
17. Explain to the students that this is quite a list of words that may not make a lot of sense right now, but that we will begin to understand these terms with the next activities.
18. Back to the aliens. *“We have determined that the children of Opah and Omah are Harold, Wilbur, and Maude. Which features seem to follow the rule that traits get passed from parents to their children?”* [Example: Eyebrows. The parents have large or small eyebrows and so do the children.] *“Which features do not seem to follow the rule that traits get passed from parents to their children?”* [Example: Mouths. The parents both have large mouths, but Maude has a small mouth.]
19. In order to understand what is happening, we need to learn *how* traits get passed from parent to child. The next activity will help us begin to understand how this happens.

